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The Classification and Treatment
of Diseases Commonly Known
as Rheumatism

PECKHAM

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The Classification and Treatment
of Diseases Commonly Known
as Rheumatism.

MOTTO:

“Vero nihil verius.”

BY

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¹⁸⁸⁶
PROVIDENCE, R. I.

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1910.

THE Trustees of the Fiske Fund, at the annual meeting of the Rhode Island Medical Society, held at Providence, May 31, 1910, announced that they had awarded a premium of two hundred (\$200) to an essay on "The Classification and Treatment of Diseases Commonly Known as Rheumatism," bearing the motto :

"Vero nihil verius."

The author was found to be FRANK E. PECKHAM, M. D., of Providence, R. I.

DR. EUGENE KINGMAN, Providence.

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Secretary of the Trustees.

THE CLASSIFICATION AND TREATMENT OF DISEASES COMMONLY KNOWN AS RHEUMATISM.

A classification must be founded on some logical basis, for example an etiological or a pathological, then the treatment can be applied much more accurately and with a much greater prospect of permanent cure. The diseases commonly known as rheumatism are those associated with pain about the joints or muscles. When in the muscles, it is commonly called muscular rheumatism; when in the back, lumbago. Sciatic rheumatism, used synonymously with sciatic neuritis, are not uncommon terms. When the joints are involved, the term rheumatism, chronic rheumatism, gout, and rheumatic gout are very common. To reduce all these terms to something tangible in the way of classification, has been a tremendous undertaking and has been attempted by many men. Most of these attempts have resulted in schemes so complex and cumbersome as to render them useless. A scheme to be useful must be as simple as possible and readily applied clinically with knowledge which may be comparatively easily obtained. A careful history of the case, a careful history of the patient's troubles which

might have any bearing, a careful physical examination not only of the particular joints or areas of pain but of the physiological processes in general,—that is, bowels, urine, liver; also an examination for flexibility of spine and for tender spots anywhere up or down the spine and for any slight deviation of vertebrae, an examination of the sacro-iliac joints, and range of motion of legs (with knee extended) on the ilia, and an examination of joints other than those complained of. Add to this a careful X-ray study and outside of some unusual and border line conditions, the case may usually be classified.

The many classifications offered in literature might all be enumerated but such a waste of time is hardly necessary in the present stage of the development of the subject. There are a very small number of types of these joint conditions which ordinarily may be differentiated without much difficulty. There are the villous arthritis, atrophic arthritis, hypertrophic arthritis, infectious arthritis and gout. These types were first described by Goldthwait. Perhaps the most logical and convincing way to demonstrate this may be to describe a typical case under each type, in this way showing why it is placed in a certain class. This will also make the treatment seem perfectly logical and for the sake of keeping the whole thing in mind as an entity, the treatment had better be placed after such description.

The simplest form of joint trouble which has formerly

fallen under the term rheumatism occurs oftenest in the knee joints. The patient complains of some pain in the knees, some stiffness in the morning especially when first getting about on them or after sitting for an hour or so, and is very apt to notice a grating or creaking on going up or down stairs. A physical examination reveals a "boggy" knee and there may or may not be a small amount of fluid present, usually not. There may be some tenderness, usually on the inner side of the joint. If the patient sits in a chair or on the end of the examining table and extends and flexes the knees, the examining hand over the knees detects the grating which may be very slight or very marked. If the patient stands with bare feet, they are usually found to be pronated. An X-ray picture shows the bones to be normal and may show a shadow or mottled appearance just below the patella and anteriorly between the femur and tibia. Such a knee, if it should be opened, would present, instead of a smooth glistening surface of the serous membrane, a loose tripe-like condition. This is due to a villous growth and then the term *villous arthritis* may be used. A villous arthritis may be present in most any type of joint trouble, as an infection, or even in tuberculosis; but in the above described condition, it exists without any apparent accompanying disease, and hence is one type of joint trouble of the so-called rheumatic group.

This condition is very apt to be accompanied by pro-

nated feet and is mostly seen in women. It is not so often seen in men. Women, unless inclined to be thin or of a spare type, are apt to have a more or less fleshy thigh. It may be observed that when such patients stand with inner surface of knees just in contact, the inner malleoli will be separated, some slightly and some quite markedly. In other words, there is some degree of knock knee. This means that there is more or less of a strain on the knee joints, this strain either from pronated feet alone or in conjunction with the above condition of slight knock knee, becoming an etiological factor. A demonstration of the strain of a knock knee causing a villous arthritis has occurred in a very marked manner in two cases coming under the observation of the writer. A young married woman had only one very marked knock knee and the knee on that leg had given trouble for years, at times swelling up and becoming tender and painful. Rest and local applications had quieted it each time but it gradually became enlarged so that it was never normal in size and was constantly grating and creaking and remaining always tender and boggy and much larger than the other knee. A second case occurred almost exactly like it in a man of middle age. The knee had given him more and more trouble until he was willing to do anything for relief. Where there is tenderness and pain and numbness around the knee and particularly on the inner side and often in addition about the ankle and anterior part

of the foot, there will usually be found a lax condition of the sacro-iliac joints with sufficient tilting of the sacrum or ilium to impinge on the lumbo sacral plexus, thus interfering with the nerve supply and producing a very direct effect upon the knee joints. In women with saggy abdominal contents, with or without pendulous abdomen, the dragging down may assist to produce the tilted sacrum or ilium, or if this is not present, may by their own weight interfere with the large nerve trunks in such a way as to become etiological. The conventional corset alone will produce just this condition in many cases.

The treatment of this condition must be twofold. It must remove the causes and at the same time this thickened boggy condition must be treated so as to cause its complete disappearance if possible. First, as to the causes. The pronated feet must be corrected by being placed in properly shaped shoes and thus the foot is balanced. This balance is accomplished by projecting the inner corner of the heel farther forward, which in people inclined to be pretty heavy will be sufficient, but in lighter weights the inner side of the heel must be raised in each individual case to completely balance the foot. Although artificial supports might be used occasionally it would not ordinarily be necessary. This balancing would also correct a mild degree of knock knee but not an exaggerated case. The markedly pronated foot in fleshy women would

call for a heel still higher and still farther forward on the inside. In the two cases cited above, where there was only one very marked knock knee and also a very troublesome and painful villous arthritis, I advised an osteotomy for the correction of the knock knee which was so evidently the cause. In the lax conditions of the sacro-iliac joints, the tipping of the sacrum or the ilium may first be corrected by manipulation. An efficient way is to place the patient on an examining table full length face down. Then by pressing downward with one hand on the sacrum, or still better having an assistant hold the sacrum by pressing strongly downward, with the other hand or with both hands firmly grasping the thigh, preferably with leg flexed at right angle, strongly force the thigh upward. By bending it upward several times the joint surfaces are levered into better apposition. This movement may be repeated at subsequent visits if necessary. In women the corset may then be improved by the addition of a belt or extension so adjusted and made part and parcel of the corset that it really supports the abdominal contents holding the pelvic girdle more firmly together. In men a belt may be made which accomplishes the same purpose. By these means the etiological factors are attacked and remedied.

Lastly the joint or joints demand treatment for the local condition which, as described above, consists of a thickened boggy condition of serous membrane.

These villi may be of a very small growth or they may become markedly hypertrophied forming regular tumors with enlarged ends and small pedicles. These larger villi may undergo fatty degeneration thus forming fatty tumors, the so-called tumor aborescens, which are mostly apt to be located below the patella and beneath the ligamentum patellae. On the other hand these villi may undergo calcification at the ends and then the pedicle breaks and thus are formed the floating bodies. It is necessary to describe the above condition in order to illustrate treatment. In the early stages or even in the late stage with secretion of fluid where fatty degeneration or calcification has not taken place, most of these cases are curable without operation. Such knees may be baked in the special ovens and after remaining for an hour may be thoroughly vibrated using the hard ball and beginning with gentle pressure. After a few treatments the pressure may be made pretty hard. The hot air bath brings fresh red blood to these parts (hyperæmia). Vibration stimulates the tissues so that both circulation and nerve supply are much improved. The villous condition slowly contracts and becomes less and less spongy. Hyperæmia may also be produced by the Bier method and might alone be of benefit in some cases, but is not so efficient as the hot air and vibration. Vibration alone is beneficial but not so much so as after the knee is thoroughly heated through. This same effect can

be produced in some cases by the so-called Morton wave current followed by sparking with the spark selector, then in tender joints the brush discharge may follow on this.

The wave current is administered by applying the circular electrode around the knees, so curved as to avoid contact with the patella and then connected to the positive pole by the static machine. The negative pole is grounded by a special chain connected to a steel rod driven into the earth. The patient is on the insulated table. The amount of current forced through the tissues is regulated by the spark gap between the poles of the machine. The best results should be obtained when the spark gap is run up to three or four to six inches. Each spark means a surging of electricity through the patient with the greatest force applied in the tissues immediately under the electrode. This produces a contraction of the tissues. Thus with each blow there is a squeezing out of any infiltration into the proper channels for elimination. In this way depletion is accomplished. Another effect is of the electricity itself by way of stimulation to the nerve supply and circulation, thus tending in a very positive way to assist nature by her own processes to restore locally the "normal." Following the wave current, a short seance of direct sparking, pressing spark selector hard against the boggy area and with the sparking ball giving spark of one-half or three-quarters to one inch in

length in order to insure its penetration into the villous growth beneath. In a tender and aching joint these treatments may be followed by the so-called brush discharge. The patient is seated on the insulated table and connected by the shepherd's crook with the negative pole of the static machine. Then the operator with the metallic rod or the "wet stick" connected by a special chain with the earth, draws the electricity from the patient at the point of greatest tenderness. This modality is a great sedative and is very soothing to such joints. Another method of treatment, but not advocated as much as formerly is the actual cautery. It is of value and now and then seems to be the one treatment needed for cure. But to use for regular treatment, it will prove disappointing. A simple treatment which can be made use of at home is hot and cold douching. Alternately pouring hot and cold water over the knee produces a succession of mild shocks and a mild hyperæmia which will be of benefit in a few cases.

Another simple method is to bandage the joint with a pure (gum) rubber bandage. This produces a local sweating and thus is beneficial. In some few of these knees, the boggie condition may yield, and yet there may remain a tender area way beneath the ligamentum patellæ, and usually on the inner side. At this point of tenderness, a small tumor may be felt to roll under the finger. This is a villus which may be fibrous

and hard, or it may have undergone fatty degeneration. In either case, surgical removal brings an end to all trouble from that source.

There are now two types of joint troubles which have been classified as the trophic types. That is, *atrophic* and *hypertrophic arthritis*. With the other types to be described, they are all due to faulty metabolism; that is, there is somewhere in the system faulty physiology. It is often impossible to locate the exact process at fault, but it has been demonstrated very many times that treatment applied in such a manner as to stimulate the physiological processes to act in a normal or more nearly normal manner, slowly results in an improvement in the joint conditions. One type is usually first observed in the smaller joints (fingers), later involving the larger joints (knees). The cervical vertebræ (joints) may be involved but usually for a short interval only, when it clears up, very seldom indeed resulting in a completely stiffened neck. The jaws are also involved sometimes (not usually). The synovial membrane becomes thickened and spongy and full of blood, thus giving the joint a swollen and boggy appearance. If the knee is involved instead of getting the sense of fluctuation when the patella is depressed, it gives the sensation of striking on rubber, there being an entire absence of the sharp click which is such a familiar sound and so easily sensed in a simple synovitis. Later the cartilage is involved, resulting in a

thinning or atrophy. If the cartilage becomes more and more thinned, there appears small areas of complete erosion, these growing slowly larger and when the areas are on opposite bones and near each other, bony ankylosis may ultimately result. When the thinning or atrophy takes place in the finger joints, the cartilage may become destroyed and the ends of the bones being forced together spread out laterally, thus making the joint enlarged. This is the type of finger joint where this enlargement was formerly supposed to be a deposit, but now the X-ray shows the exact condition. These enlarged finger joints were also very apt formerly to be called gout, or worse yet rheumatic gout. The enlargement is thus due to the thickened synovia and villi, and some infiltration of soft parts and to the projecting bony contours, and is not a deposit at all. As the principal thing in this type of trouble is the thinning or atrophy of the cartilage, it has been classified as *atrophic arthritis*.

In the knee joints, the villi become of considerable size and then undergo fatty degeneration or else the ends may become calcified. These calcified tips may break off from the pedicles and thus become floating cartilages. There may be only two or three villi of some size under the ligamentum patellæ, usually on the inner side. In this position, they become pinched in walking and getting tender give trouble both on account of the tenderness and pain and on account of the

mechanical interference with the mechanism of the joint. This type of joint trouble is very slow (chronic) but continuously progressive. It requires several years to run through its course and also may remain slowly advancing throughout life. The enlarged terminal joints of the fingers are usually the first symptoms and during the active stage of atrophy and projecting bony contours, may become painful. Later when the larger joints (knees) are involved, there is more pain on account of the villous arthritis as well as the eroded surfaces and it is not uncommon to have the flexor muscles of such joints contract, these muscular contractures becoming of importance in treatment. In this class of cases some patients may go along with slowly enlarging finger joints and involvement of larger joints resulting in more or less of an ankylosis. Over these joints some of the enlargement is very evidently due to an infiltration of the soft structures. In some other cases, if observed from time to time, these finger joints may become more or less tender and even now and then somewhat red and inflamed (low grade). Usually these joints do not give so very much pain but are achy and tender (if knees) when walking or weight bearing. They are stiff and the knees bother much in going up or down stairs, the villi and erosions causing grating and creaking. It is necessary to consider the causes of this trouble as the modern treatment is aimed very largely at such causes. It is becoming

more and more evident, as the result of treatment is observed, that this type of joint trouble is due to faulty physiology somewhere and that *if* it can be stimulated to do its work properly, the joints slowly get well.

It goes without saying that when cartilage has been destroyed, it cannot be restored. To stimulate the physiology, various means are employed but first of all it may as well be said that medicine (drugs) simply will not do it. Persons who are under a great deal of tension either from worry, grief, etc., (mental tension) or overwork (physical tension) or both which is still worse, may slowly develop this trouble, but it is caused by the interference with physiology. Patients who have already had this type of trouble, even for years, may be made worse by grief and sorrow and with the passing of such trouble may improve and get back to their former stage of the process just as before. Sorrow or mental strain interferes mostly in the way of digestion. Any one who has had a severe worry for a short time knows of what little use it is to eat, as the food remains in the stomach for a long time as a "lump of distress" before it passes on and even may continue to give intestinal disturbance all the way through. Such people may become constipated or even diarrhea may be produced. In this way, assimilation is interfered with or the lymphatic stream is not properly prepared. This would cover only a very small number of the cases, however, most of them beginning in a

very insidious manner, the patient probably not noticing it for a long time. A careful history is a great help, followed by a thorough physical examination and an X-ray photograph of one or more of the joints, to make sure of this type. The patient may be doing entirely too much (physical strain) or (usually) it will be found that there is something wrong in the alimentary canal somewhere, irregular eating, too rapid eating, faulty preparation of food in the mouth from bad teeth or insufficient teeth. The stomach or intestines may be interfered with in their working by corsets and clothing. The liver may be doing its work poorly and thus be a disturbing factor.

Perhaps the most typical case simply comes on slowly, usually the finger joints followed by larger joints, or the fingers may never become involved and only the knees and hips be attacked. In such a case there would not be much pain but the symptom most complained of would be *stiffness*. After sitting for an hour, the joints would be very stiff on first getting up. While sitting or lying down, there would be an entire absence of discomfort. Consequently sleep is not interfered with. On getting up and attempting to go up or down stairs, there is a stiffness and later a limitation in motion. Now this limitation in motion in such a case where there is no villous arthritis and no erosion, is due to a beginning fibrosis. In such a case, the faulty physiology must result in absorption of

products which result in this condition without causing any temperature. Such joints, if manipulated under ether appear perfectly freely movable without any apparent grating and roughening. In other words they feel like perfectly normal joints. This resistance in the earliest stages would seem to be located in the ligaments. Such manipulations however are to be avoided as the result is to produce a marked stiffening and pain on voluntary motion. This aggravated condition may last for weeks and months before getting back to the former state, thus causing the patient just so much unnecessary pain and discomfort. That this trouble is due to absorption or faulty assimilation is brought out by the fact that a case that has gone along for months and even years in this way with a slowly increasing fibrosis, may begin to have the first mild attacks of swollen joints especially in the fingers. As time goes on and this phase of the disease appears, these attacks may gradually become more severe and a temperature exists in proportion to the amount of inflammation. In such a case, the patient must be carefully questioned. The method of eating is highly important. In the first place not too much must be placed in the mouth at any one time. This gives a chance to chew and mix it thoroughly with saliva. It will be found that most people put the food into the mouth in rather too large quantities, chew a little and then either swallow it by pushing it down, by taking a drink

of water, coffee, tea, or whatever the favorite drink may be. Eating in this way, there is not much demand made on the salivary glands and in consequence they "get out of practice" as it were; and as a chronic thing not much saliva is secreted. This is the first step in digestion and it is right here that faulty physiology begins and must be corrected. This is a highly important part of the treatment and patients must have it explained to them in detail, so that they may appreciate the situation. When the food is chewed and thoroughly mixed with saliva, swallowing practically becomes an automatic process and the food swallows itself. Towards the end of the meal, one becomes conscious of forcing the muscles to swallow. Then appetite has been appeased and the meal must be considered completed right there. If this method of eating is pursued, the salivary glands secrete the juice much faster and if drinking for the purpose of washing down the food is done away with, the desire for drink while eating disappears. Eating in this way after it has been practised so that one does it unconsciously does not require much, if any more, time than the old way. It will be seen that water is thus done away with quite naturally at meal time, and so must be taken care of between meals. In the morning before breakfast is a good time to drink as the water is absorbed very quickly in the stomach that has been empty several hours, then middle forenoon, middle afternoon and

evening. If water is not drunk constipation results with a still greater auto-intoxication. Food prepared in this way enters the stomach ready for its treatment with gastric juice then to be sent on into the intestines. In men the abdominal contents are not displaced by corsets, but in women this is an extremely important factor in digestion. The conventional corset constricts at the waist line (the small waist is a fashionable necessity) thus forcing the contents downwards. Even the long corsets do not support from below as they ought to. This constriction and forcing downwards of the abdominal contents interferes with intestinal action and thus the physiological activity, whereby the intestinal juices are secreted, is interfered with. This sagging of the intestines and diminished intestinal secretions mean a slowing of the intestinal stream with its consequent constipation and the formation of bacteria and toxines. Also the end products which are finally supplied to end organs are changed as to their composition. In this way, nutrition is interfered with. The whole physiology is demoralized, any way in portions of it, which seems to result in trophic joint troubles. The liver also is an extremely important organ in all these troubles. It stands between the alimentary canal and the final stream which distributes to the various physiological depots and serves to filter out the infections and toxines. When it is not acting properly and some of these products are allowed to pass through, then some of these various joint disturbances arise.

The proper preparation of the food in the mouth having been described, the treatment of faulty digestion in the stomach and intestine must be corrected likewise. A liver which is not doing its work properly must be attended to. Each pair of conventional corsets which you may examine "in situ" will show a waist line more or less constricted and from this waist line downward the corset is so made that it does not support the abdominal organs. This constant pressure and the downward sagging, causes atony and weakening of all the muscular walls, hence a marked slowing of the physiological digestive process. As a result there is a backing up of the partially digested products with a resulting putrefaction and growth of the various bacteria and their toxines. These are carried through the system and as a result among other things, the joints are affected. These are the true causative factors and must be remedied. The corset must be taken in hand, and an extension made and fitted in such a manner that the lower end passes beneath the abdomen, and, by being perfectly fitted and moulded, really support the abdominal contents. Then the corset must be laced in three sections, the lower one sufficiently tight so that proper support and pressure upward is really obtained. The section at the waist line must be looser so that the organs will have space for them to go when they are pushed upward and the upper section should be loosest of all to allow perfect freedom

for breathing. The corset makers are apparently unable to do this and so the physician must do this work in order to be sure that it is anatomically correct. In this way support of the abdominal contents is obtained and a shortening of the supporting ligaments and structures. The next thing in treatment is to stimulate in some way the functions of these organs, to restore tone to the muscular fibres which "work" the stomach and the intestines, and to tone up also the supporting structures so that sagging will not be so marked. This is done most effectively by some of the forms of electricity and mechano-therapy (vibration). General vibration will very markedly stimulate physiological processes. In the first place a vibrator with a massive base is a necessity, if the vibration is really to be "sent in" and to produce the desired results. Why so many fail to produce these results is that they buy a small and light vibrator where a large part of the vibration wave is taken up by the hands of the operator and hence not transmitted through the tissues except in a very insufficient way. The hard ball of the vibrator is used on the nerve centres between the transverse processes up and down the spine. In this way, waves of energy are transmitted along the nerves to the various organs and structures at the end of the nerves. A pressure of from five to eight or ten seconds is stimulating. A longer pressure would be inhibitory. The soft brush is now used over the liver

both front and back. This organ can be very markedly stimulated by this means and in a way which cannot even be approximated by medicine. The soft brush of the vibrator is continued over the stomach area, the hard ball over the abdominal lymphatics and again the soft brush over the general area of the abdomen. These latter measures stimulate the stomach as an individual organ increasing the tone of its muscles, thereby increasing its efficiency in work accomplished. Likewise the muscles in the walls of the intestines are markedly stimulated also increasing their efficiency and the abdominal lymphatics are likewise stimulated to do better work. All this means increasingly better preparation of food for assimilation. The stimulation applied thus directly to the muscular walls raises the tone of these organs and thus largely corrects the sagging of the abdominal viscera. In this improved condition, the intestines perform their functions better and better and the assimilation of food (end) products is accomplished in a more nearly normal physiological manner. With the improved tone in the muscular walls of the abdominal viscera, there is less and less backing up of the stream and hence less and less decomposition which means less and less absorption of bacteria and toxins. If this absorption of bacteria and toxins is the real cause of chronic joint disease, it is at once seen that these conditions are in this way attacked right at the source of all trouble. With this

correction of the physiological process, the bacteria or toxins cease to be sent into circulation for distribution and thus the onward progress of the disease becomes slowly checked. At the same time this general treatment is given, aimed at the direct cause of the trouble, the joints themselves must receive careful attention. Vibration may be used to stimulate the tissues and their local processes. The soft brush may be used on the wrist and finger joints making a pretty firm pressure on both palmar and dorsal surfaces. The soft brush may also be used on the elbow, shoulders, hips or ankle joints. On the knees much better work may be done by the hard ball. If a villous arthritis is present, as it is so apt to be, the hard ball is a very efficient means of causing a contraction and slow disappearance of the condition. In addition to the mechanical vibration as above described, some of the newer electrical modalities are of very great service in producing certain very definite results. The wave current is a very strong tonic to the general system. This may be applied by a long flexible metal electrode placed longitudinally along the spine and connected to the positive pole of the static machine, the patient being seated upon an insulated table. The negative pole of the machine is grounded by a chain leading to a special steel rod driven into the earth and the dosage is regulated by the length of spark gap between the poles of the machine. The longer the spark gap, the deeper

the impulse of the "wave" penetrates into the tissues. If the metallic electrode is placed over one of the diseased joints, it derives more benefit because the greatest effect on tissue is obtained directly under the metallic electrode. In case of knees, if a large machine is employed, a metallic electrode may be applied to each knee and both connected to the positive pole thus getting the maximum effect directly upon the knees. This treatment is allowed to continue usually for twenty minutes. Following this, the affected joints may be given a thorough sparking. It is better to use the spark selector (Snow) by which it is possible to deliver the spark just where it is needed. The patient is seated on the insulated table and connected by the shepherd's crook with the positive pole of the machine. The negative side of the machine is grounded by a special steel rod. The operator with spark selector and ball (the ball being grounded by a chain connected with gas or water pipe) thoroughly sparks the tissues all around the knees with a length of spark which should penetrate one-half or three-quarters of an inch. Neither of these treatments are painful to the patient as the metallic electrodes are in close contact with the skin when the wave current is given and the spark selector is in actual contact with the skin as each spark is delivered, hence it is sent in without discomfort to the patient. With the wave current, as each spark jumps across the poles of the machine, a current of

electricity surges through the body with the maximum effect at the joint. A contraction of tissues takes place thus squeezing out any infiltration which may exist and has a marked contractile effect upon the spongy tissue like a villous arthritis. The spark sent in by the spark selector has the same effect only it is localized more exactly in this way.

If the joint is particularly tender or painful, the wave current and sparking may be followed by the brush discharge. This may be obtained by the metallic (pointed) electrode or the wet stick electrode. The patient is seated upon the insulated table connected to the negative side of the machine by the shepherd's crook, while the positive pole is grounded. The metallic pointed electrode or the wet stick is connected with the earth by means of a chain to the water pipe or gas pipe. The point of either electrode is then held within one or two inches according to the effect produced and if the room be darkened, a fine purple or violet spray may be seen between the skin and the electrode. This relieves pain and tenderness in many cases. Another treatment which strongly stimulates the nerve centres, is to have the patient reclining upon a couch, the back bared to the skin and then exposed up and down its whole length to the light emanating from a five hundred candle power incandescent lamp. The stimulation of these nerve centres conveys impulses to the various end organs corresponding to these

centres and thus the physiology of the abdominal organs is reached. If one joint is especially painful or achy, a twenty minute exposure to this light will often serve to completely alleviate the pain. The enlargement (infiltration of soft structures) of the small joints (fingers) is stimulated usually in a very noticeable manner by the D'Arsonval current. These joints may be made to contract and diminish in size in this way sometimes when other methods fail. A small metal electrode is bandaged to the palmer surface of the fingers and the D'Arsonval current applied by placing the glass vacuum electrode over the dorsal surface. This treatment may be continued for ten minutes on each hand. In an atrophic type with marked villous arthritis of the knees which might resist all treatment, opening the joint and thoroughly cleaning out the villous growth with forceps and scissors will put an end to the trouble in that particular joint. After the operation splints are used and walking is allowed at the end of a week or ten days. Another clinical picture of joint trouble is the *hypertrophic type*. In order that the treatment may be shown as logical and rational, the condition of the joints will have to be shown a little in detail and the etiology discussed. The principal characteristic of this condition is the overgrowth of bone or cartilage usually at the edges of the articular surfaces. The stage of actual hypertrophy is a late stage as may be quite definitely proved by considering

the process when it attacks the spine where it is most often spoken of as an osteoarthritis. In this location the patient consults a physician at a much earlier stage than when some of the areas of joints are involved. In this stage there is pain on motion of the spine in flexing and side bending which interferes very directly with occupation and from the fact that the spine is involved, patients are earlier referred to the orthopedic physician and not so much time is wasted while the condition is treated with the usual anti-rheumatic remedies. In the earliest stage hardly any hypertrophy or overgrowth of bone exists, but there is an infiltration of the soft structures which is undoubtedly due to auto-infection (either toxines or bacteria).

This thickening is usually confined to one side only in the beginning, and so when the patient stands with back towards the observer, lateral bending shows the spine curved normally to one side and limited in its excursion on the other. When both sides are involved the excursion on both sides is limited and usually one side more than the other. Slowly as time goes by, there takes place a deposit of bone salts and if not arrested the vertebræ become fused together in a condition of ankylosis. In this stage which precedes actual bone formation the condition is ordinarily completely curable. The wave current may be applied with long metallic electrode, twelve to fourteen inches long, by three inches wide, placed directly over the affected re-

gion and being connected with the positive pole of the machine as described above, continue the treatment for twenty minutes with a spark gap of four to six inches. This should be followed by sparking as described above with the spark selector, pressing the end deeply into the intervertebral spaces all up and down the affected area. This treatment causes the contraction of the tissues which squeezes out and depletes, also stimulating activity in the nerve supply and circulation thus markedly hastening local elimination. This may be followed by a general vibration, the hard ball in the intervertebral spaces, stimulating the nerve centres which convey impulses to end organs (abdominal viscera) and the soft brush over the liver, both front and back, and also generally over the abdominal area. Also the hard ball is used over the abdominal lymphatics. In this way the abdominal organs are stimulated to perform their functions in a more nearly normal physiological manner and as the normal is approached, the backing up of the stream with its consequent constipation, formation of ferments, bacteria and toxins are slowly caused to disappear. Many of these patients have more than an unnoticed sluggishness in liver and intestines. They may actively complain of symptoms of indigestion, either stomach or intestines, and it is very common to find, when using the vibrator, that there are tender spots over the spine which correspond accurately (as now mapped out in the phys-

iology) to the centres for the liver as well as other abdominal viscera and it is not uncommon to find the whole liver area somewhat tender on precussion.

An extremely marked case came under observation this last winter. A woman of forty or forty-five was referred to the writer because of a very tender and sensitive spine. It was considered as some spinal disease because of the location in the spine, the patient being confined to bed, because supporting the superincumbent body weight caused pain in the tender area of the spine. Turning in bed was also uncomfortable. Physical examination revealed three or four vertebræ very tender. Very slight pressure caused pain and flinching. As this area corresponded accurately with the nerve centres for the liver, an examination both front and back showed that this whole surface area directly over the liver was extremely sensitive to pressure. Thus a complete clinical picture showing that congested liver, by its reflex effect on the nerve centres had produced so tender a spine that some disease of the spine had been diagnosed. The proof of the diagnosis seemed to be confirmed by the fact that when the liver was depleted by appropriate treatment, the spine gave no evidence of disease and tenderness, and the patient has remained well several months now since the attack. Thus in the early stage of osteo-arthritis often called rheumatism of the spine, in this location it would seem that the direct results of treatment had been such

as to prove very conclusively the localized infiltration (auto-infection) and that this condition is usually curable any way in the stages preceding the actual deposit of bone salts. If the infiltration continues there may be severe pressure of the nerve trunks even without bone formation. This pressure usually results in pain in the nerve terminals as well as discomfort and tenderness at the point of infiltration. This may be so severe that patients are no longer able to continue at their work or occupation. Under such conditions, quick relief may be obtained by the application of a plaster jacket with the spine held in a somewhat hyper-extended position on a frame, or if too tender for that, the first jacket may be applied with the patient standing in the best position he can assume, and after the relief thus afforded, a second jacket could be applied a week or two later when the spine could be made perfectly straight or even hyper-extended. The first or second jacket could be a removable one in order that the treatments as outlined above might be instituted and a complete cure obtained. The relief under these conditions is somewhat startling in its suddenness. A case in point may be briefly mentioned. A man of about forty years, whose business called upon him to be on his feet a great part of the day, running in and out, and up and down stairs, was attacked with this condition in the spine. Pressure on the nerve trunks had taken place and the pain developed

at the terminal nerve areas around the inner side of the knee and about the ankle joint. He had been examined and prescribed for by half a dozen medical men who had all examined his knee and ankle and considered it neuralgia and neuritis of these joints. The patient was in bed at my first visit. The next day a plaster jacket was applied in the standing position and two days later when I made my visit, the patient had gone down town. A few days later he reported at my office. He was back at work and free from pain.

In the later stages after bone salts are deposited and pressure has taken place with its consequent pain in the nerve terminals usually somewhere down the leg, the jackets as just described are necessary, and if the process has gone on far enough and the spine is bent over forwards, some of the curve and in some cases all of it may be corrected by successive jackets, with or without ether. At the same time that pressure is removed, pain is relieved and the patient really lives again. After the spine is straight, the jacket is made removable or a lace-up leather jacket is applied so that the treatment of the spine and of general physiology may be administered. In such cases, where bone salts have been deposited there can be no absorption, but the process may be halted so that no more will be deposited and the physiology, as described above gotten in a normal or more nearly normal condition. Under these conditions, there is undoubtedly some

shrinking of the deposit as it becomes hardened and thus the patient may go through life with a fair degree of comfort.

In these cases of spinal involvement, the all-over electric light bath is a most valuable addition to the treatment, especially in cases that yield with difficulty to the treatments as outlined above. Where this hypertrophic type involves the knee joint, in the cases that have come under the writer's observation, it is more apt to be accompanied by a villous arthritis. The spurs or lipping may be on the edges of the patella or on the edges of the articular surfaces of either the tibia or femur. These overgrowths may be present in considerable quantities and yet not be in quite a location to interfere mechanically and cause pain and tenderness. In such a knee with villus thickening, it is the boggy and swollen condition of the membrane which causes the pain and discomfort, and the treatment already outlined, — that is, baking, vibration or wave current, and sparking with the general vibration treatment of the spine, liver, stomach, and abdomen, will cause the slow shrinking and disappearance of the congested villi, and then these hypertrophied areas will give no trouble. They also may shrink some and the patient go on without trouble. On the other hand, in a case which might not yield to this treatment but persist in causing pain and tenderness in walking or going up or down stairs; or in a

case where bone formation might not be so extensive but in such a location as to interfere mechanically and cause pain, an open operation would be necessary for relief, with removal of the swollen and thickened villi and also of the spurs of bone.

In these villous conditions which really come to operation, it may be found that the whole joint surface is usually completely covered with this swollen and congested villous tissue. It is completely gorged with blood and consequently bleeds very freely when cut into. This cannot be curetted off as the sharpest curette slips over it without removing it. It must be caught up with forceps and cut off with curved scissors. In this way, the whole joint surface must be thoroughly reached through two longitudinal incisions, one on each side of the knee. The supra patella pouch must not be omitted. Then these bony spurs must be removed and the knee closed. It should not be splinted or placed in plaster of Paris but a sterile dressing applied and the patient will then bend it a little when moving about in bed. At the end of a week or ten days, walking and using should be begun and the knee bared every other day, and passive motion utilized every day. In knees where an extensive growth of these villi exist and the inside of the knee has to be practically skinned to completely remove it, forcible moving and breaking up of soft adhesion may be necessary once or twice before complete motion is

established. In such cases there may be many villi and small spurs or few villi and many spurs. After recovery from operation, it is very important to go into the general treatment if the patient will do so, as it is the general process (faulty physiology) which needs treatment in order to prevent future trouble.

Where the hip joint is involved with this overgrowth (*morbus coxæ senilis*) it is very important to know it as early in the process as possible. The hypertrophy may exist around the edges of the acetabulum, making the socket deeper and by mechanical blocking, interfere with the extreme range of motion. The same thing results if the growth is on the trochanter. Patients are very apt to experience difficulty in bending over to lace up their shoes as an early symptom. If the hypertrophy takes place when the motion of the joint mechanically irritates, it is better, if the patient will do so, to use crutches, relief thus being obtained from the aggravation of motion with the body weight upon it. Then the physiology of the body should be stimulated and improved by eating properly as already described, by vibration to the spinal nerve centres, liver, abdomen, and lastly to the hips. Then there should be a fifteen or twenty minute treatment with a glass vacuum electrode connected with a high frequency coil. This stimulates by reason of the action of the electricity itself and a marked local hyperæmia is also produced. In this way a marked impression may be

made on the process. If allowed to go on untreated, the bone salts are laid down, going through the process in a longer or shorter time, but usually years rather than months. At the end of this time, the motion is very apt to be much limited mechanically, and in aggravated cases the joint is completely stiffened. If the diagnosis is only made early and the patient will submit to treatment, this course may be very much shortened and the amount of the deposit reduced to a minimum so that at the end, the limitation of motion may not be great and walking and going up and down stairs not much interfered with.

The process is the same in any joint which may become affected. The fingers are often involved in this type of trouble. General treatment must always be instituted, never forgetting that the joints are only external manifestations or symptoms of the general process. This means general vibration to spine, liver, abdomen, and lastly treat the joints. In the fingers the D'Arsonval current is very valuable and in conjunction with exposure to the five hundred candle power lamp, will very markedly relieve pain, thus rendering splinting unnecessary and also causing actual diminution of the infiltration of the soft structures if such exists as it usually does. The surgical removal of these spurs is called for when they mechanically interfere with movement. The knee joint, in my experience, is the most often treated in this way. The hip joint is the most difficult one for such removal.

As all of these types to be described, with the exception of villous arthritis in the ankles and knees which is probably due to mechanical strain, are due to faulty physiology and hence to the absorption of bacteria or toxins, they might all be placed under the head of infectious arthritis, but it is a decided help clinically to have the different types, as there are only five of them and as it is usually possible to differentiate one from the other. The help obtained is very great when one has to examine and treat a considerable number of such cases. Under *infectious arthritis*, as it has been thus far classified, are included cases in a much more active stage than the preceding types and are usually traceable to some definite infection. The joint lesions may be due to the poisons of the bacteria or to their toxins. Perhaps with our present knowledge and with our present methods of examination, it would seem that most of the cases were due to toxins simply because the bacteria are usually not to be found. Probably with increased knowledge and further refinements in technique, the bacteria may be found with increasing frequency either in the fluid or the surrounding tissues. In a case from some active infection, the onset is usually sudden. Several joints will be involved, either all at once or one after the other in rapid succession. Most of them will clear up leaving only one or two finally involved, but nevertheless, the condition is manifestly a progressive one. In both cases, the

soft structures are swollen, spindle shaped around the joints, the distention causing pain either from the distension itself or from pressure on the nerves. In the acute case, it is severe; and in the aggravated type, there is delirium from the septic absorption. In the slower type there is usually a rapid pulse, even though there may be no temperature, thus conveying the message of a septic condition. In the acute type, the organism will be found in the joint fluid and anyway in the structures, and the fluid is more apt to be pus and the destruction of structures greater.

For treatment to be applied in the most intelligent manner, the focus of infection must be sought. It cannot, by any means, always be found, but if it can, much greater good can be accomplished. In a chronic progressive case with acute exacerbations, usually following tonsilitis, it is fair to presume that the tonsils are the focal points of infection; and in such a case the removal of these organs is to be advised. Many times after the joints are restored to normal condition, there may be no further trouble. This would demonstrate that the diagnosis was correct. Septic involvement of the joints may occur in any of the infectious diseases, — typhoid, scarlet fever, pneumonia, grippe, gonorrhea, etc. If due to toxins, any fluid in the joints will probably be serum while if the organisms are present, it is more likely to be pus. Toxic joint troubles may follow confinement and if serious blood poison be present,

the organisms are more likely to involve the joints with pus formation. This toxic sequence is more apt to result in some paralysis. Joint involvement in a pneumonia is not very common, but it does happen. The writer has observed two cases. The most common sequence is that following gonorrhea, formerly called gonorrheal rheumatism. If the organism is actually present, the result is more apt to be pus and the process may be a very destructive one. In acute conditions of joints with contractures in the knees where there is much suffering and tenderness and excruciating pain, the greatest relief may be obtained by fixation in plaster for a few days only. Then it may be changed when it will be found that the knees may be placed in a much straighter position. Fixation ought not to be continued for very long, because it would tend to make the joints stiff. As soon as the plaster is omitted, appropriate treatment may be begun at once.

In gonorrhea, the joints may become involved early or late. If early, it is fair to presume that the organism or toxine is due to gonococci, but if late it is more than apt to be due to the secondary infection, either streptococcus or staphylococcus. A gonorrheal urethritis is simply a discharging sinus, and, like all such sinuses, it is not very long before secondary infection takes place and the joint involvement may be due to these organisms or to their toxins. In these cases, the sem-

inal vesicles sac becomes involved and then as the weeks go by, this sac becomes the reservoir continually distributing some of its store of poison. In this condition the joints themselves need treatment but at the same time this focus needs the utmost attention and this will be first discussed. In every case of suspected gonorrheal joints, the rectum should be examined to establish the condition of the seminal sac. This may be much enlarged and tender, or it may be only tender and somewhat more tense not being especially enlarged. If only tenderness exists, it is usually enough to make one feel pretty certain of the diagnosis.

When the extreme importance of this focal point was appreciated, stripping (so-called) was employed. This consisted of passing the finger above the sac (if possible), then pressing firmly against it and slowly withdrawing, thus mechanically pressing out some of the contents. Repeating this manœuvre several times the the sac was emptied to some extent, and keeping it up every other day, it was finally supposed to remain empty and in consequence the poison ceasing to be distributed, the joints would slowly get well. This was true in some cases, but not in the great majority of them. One all important objection to this method was and is, that in most men the finger is too short and that it does not quite go *above* the sac, hence there is always some fluid left. The positive proof of this lies in the fact that commercialism attempted to remedy

this by offering for sale an extension arrangement whereby the finger was made longer. This also was not quite satisfactory because the sense of feel could not be supplied to the mechanical extension. The next step in the attack upon the sac was made by Dr. Fuller who operated by the perineal route and drained it. The next step in the attack is the most efficient of all. It is not nasty like stripping and is not disagreeable to the patient. The patient is placed upon his side on the insulated table with the back towards the static machine. A glass vacuum electrode (Titus) is inserted into the rectum with the concave side toward the seminal sac and connected to one ball of the machine, the other ball being grounded. A sufficient amount of energy is generated to allow of a four to six-inch spark gap between the balls. Every spark across these balls means a surging of electricity through the glass vacuum electrode which is directly against the seminal sac. Every blow means a contraction of the tissues, thereby squeezing out the infiltration and also a succession of such blows means an emptying of the sac which can be demonstrated by finding the contents in the urethral canal. In addition to this is the marked stimulating effect of the electricity upon the surrounding tissues thus toning them up and restoring them to a normal physiological activity. This modality also renders organisms sterile thus causing a cessation of their ability to propagate. This is far and away superior to

any possible effect to be obtained by stripping. The treatment is always gauged to the agreeable tolerance of the patient so that there is no pain attached to this part of the treatment. Any urethritis which may be present should also receive proper treatment. All of the various injections have been tried, but in the writer's hands, the most efficient of the injections is a weak solution of AgNO_3 . ($\frac{1}{2}$ to one grain to 6 ounces of water). This the patient learns to do himself very well, always remembering to void the urine just before injecting. Many eroded surfaces which resist this treatment, may be painted locally with a stronger solution. Strictures of either large or small calibre call for appropriate treatment, and a word about these. Strictures of large and moderate calibre are perhaps still best treated by "sounds," but the small ones are best and most efficiently treated by galvanism. It is much better than tearing (divulsion) or cutting as both of these operations result in scar tissue which contracts again, but when done by galvanism there is no scar tissue, and there is no contraction and the result is all that could be desired. Thus the urethra is treated as to its calibre and urethritis and the seminal sac emptied and contents rendered sterile. At the same time, this treatment is inaugurated, the joints themselves must be attacked. After the seance with the glass vacuum electrode against the seminal sac, the patient may be seated upon the insulated table and the affected joints

thoroughly sparked, using the spark selector (Snow). The spark gap between the balls must be such as to give one-half to three-quarters of an inch spark into the tissue thus causing tissue contraction and thereby squeezing out the inflammatory products into their proper physiological channels for elimination. All of the affected joints ought to have a thorough sparking. If one or two are particularly tender, a few minutes with the brush discharge will often give great relief. For this treatment, the patient is on the insulated table connected to the negative side of the machine while the positive side is grounded. The balls are widely separated while the operator holding a pointed electrode (either metallic or a wet stick) within one and one and one-half or two inches of the tissues, a fine purple spray may be seen passing between the tissues and the electrode. This brush discharge if continued steadily for a few minutes will often relieve an aching joint. These treatments applied from a high frequency coil are not the same, and equally good results cannot be obtained. In cases, where ankles, or ankles and knees are involved, both legs may be thoroughly bandaged up to the groins with towels and placed in the hot air oven for one hour with a temperature of three hundred to three hundred and fifty degrees. This produces a profuse local sweating, thus eliminating some products of inflammation locally and at the same time producing a hyperæmia and also stimulating the circulation and

nerve supply. If baking is thus employed, the joints should be thoroughly vibrated immediately after removal from the oven. The soft brush is better used about the ankle joints and feet, and tendo Achilles and firm pressure employed. The knee joints are better treated with the hard ball as deep pressure may be exerted and almost direct contact is obtained with the thickened and infiltrated soft parts and the villous condition if it exists.

Another modality may here be made use of. The glass vacuum electrode connected with the high frequency coil, may be used for ten minutes on each knee, producing a hyperæmia and also the electricity stimulating nerve and circulatory supply. While speaking of these physical methods, one method of treating urethritis must be mentioned because it is perfectly scientific and must of necessity be more and more used. In a beginning gonorrhea, when the inflammation is confined to the anterior urethra and before there is any secondary infection (in other words entirely gonococic) the process should be quickly controlled and further extension prevented in the following manner. After voiding the urine, thus thoroughly washing out the urethra, the patient is placed upon the insulated table lying on the back. A urethral glass vacuum electrode is inserted and connected with the negative side of the machine for the first few treatments. The positive pole is grounded, then the spark gap increased

up to the agreeable tolerance of the patient, perhaps two, three, or four inches. The treatment should be continued twenty minutes. Connected thus with the negative pole it is supposed to have a greater effect in rendering the organisms sterile and so not capable of propagating. Two or three treatments daily for two or three days, then the vacuum electrode might be connected with the positive pole of the machine. Connected thus, the current is much more stimulating and has a greater effect in toning up the parts locally and effecting a complete restoration to a normal physiological condition. In this manner, it will be readily seen that the activity of the organism is very easily destroyed and secondary infection prevented which is a *real* cure. Any number of such cases have now been treated and with unvarying success. A recent case of over a year's duration where the ankles and knees were especially involved with an active urethritis and an enlarged and tender seminal sac and prostate, a half dozen treatments with rectal electrode and sparking have done for the patient more than anything previously attempted.

If an established urethritis complicating a gonorrhea or (as usual) its secondary infection, the joints may be distended with fluid. Usually this will be a serous fluid. This may be at once aspirated and if the joint has been markedly distended, in other words, if there has been a large quantity of fluid present, it may be

put in plaster of paris for a few days only for the sake of removing the irritation due to the constant motion. It should after a few days be removed and the joint baked every other day. If an office case, and vibration with the hard ball is possible, it should be done immediately after baking. If the amount of fluid is not too large, the knee may be bandaged with a stockinette bandage for the sake of compression and baking should be begun immediately. If possible the baking should be followed by vibration and a hyperæmia produced by a glass vacuum electrode from a high frequency coil. In an acute case with a destructive process advancing rapidly, the joint may have to be opened and the contents evacuated. The joint may then be washed out very thoroughly with hot saline, spending twenty minutes or more when it may be possible to close the operating wound tightly and treat as above described with no further trouble from the active process. Some very bad cases, have behaved very nicely in the writer's experience when treated in this way. If on the other hand, it does not behave well, the joint should be drained through and through so that every portion may be *very, very* thoroughly irrigated daily or twice daily until the infection is killed out. This infection might be a gonococcus or some secondary infection. As such a case slowly recovers (and it is generally very slowly), the joint is stiffened by adhesions and there will be a tendency to contractures;

hence the treatment must be planned to prevent these complications. A posterior wire splint with the foot piece at right angles so as to hold foot and prevent contraction of the tendo Achilles, and extending up to the fold of the buttock so that the knee may be placed in a completely extended position, will prevent contracture. Twice daily if possible this splint should be removed and knee and ankle manipulated to prevent, as much as possible, the formation of adhesions and as soon as recovery has gone on far enough, the knee and whole leg may be baked and the joints manipulated immediately after; and just as soon as the patient can be moved the various treatments as above described should be instituted. As these treatments cannot yet be obtained in most hospitals, it means that such patients are better treated and recover faster as soon as they can get to the office where such things are available. The finding of the gonococci in the joint fluid is rather rare although it must be present, and would probably, if put through the guinea pig, be demonstrated. If not found in the fluid, it would be more apt to be found in the soft tissues around the joint if in an open operation, some were taken for laboratory examination. A recent case of gonorrheal arthritis under the writer's care had fluid in both knees and the gonococcus was actually found to be present in the fluid. It was a very mild case. There is a marked difference in the virulence of the organisms in different cases.

The vaccine treatment has been left until the last. It has been demonstrated by Dr. Wright that the opsonic index would show what particular infection was causing the trouble; and then the vaccine should be made from this particular organism taken from the individual (autogenous vaccine), this to be followed by subsequent injections, the dose to be graduated according to the opsonic index. To establish this index and to treat each time in accordance with it, has been found impracticable so far. Autogenous vaccines, however, may be used without going through all this work. In gonorrheal joints, this method has been used by various workers and although some of them (not many) report that the results are encouraging, if anyone who is treating a considerable number of such joints in accordance with the methods above given will read any of the written reports of vaccine work, even by the most enthusiastic of its exponents, and will carefully analyze the results, taking into consideration the time required to produce these few results reported, such a worker will find these results when compared with his own very disappointing and not to be compared with what he is already getting. To begin with, scientific workers frankly say that the recognition and isolation of the gonococcic bacillus is very hard and *very, very* disappointing. This throws very much doubt on some other workers who apparently have no such difficulty. This alone makes the preparation of

an autogenous vaccine in this particular field an extremely uncertain thing. As far as commercial vaccine is concerned, after using it faithfully on a line of such cases in hospital (ward) cases, the results were absolutely "nil." It must however be said that in this experimental work absolutely no other treatment was used, the urethritis itself remaining untreated in any other way. Thus any result obtained would have been due to vaccines. There are cases of such joint involvement which recover very quickly. The writer's experience with now and then a mild case with a moderate effusion in the knee joint is that they never give any further trouble after a single aspiration and a few bakings (hospital ward cases). If vaccines (commercial) had been used, the result might have been attributed to them. Such a case, by the way, would probably have no urethritis. The use of vaccines then in the writer's opinion should be confined to autogenous, and if used at all would come in on the very chronic cases which resist all treatment and then should be used in conjunction with some of the other methods. In such a case the chief and crippling infection would almost always be the secondary and not the primary or gonococcus. Such a case would almost always be dependent on the seminal sac and the treatment should be planned to attack the focal point as well as the joints, even though vaccines should be used. Some old chronic cases of this type are very resistant to any

and all kinds of treatment and no method can yet report one hundred per cent of cures to say the least. An extremely interesting case of such a type presented itself at the clinic one day. Most of the joints of the body were involved and had been for many months. A careful history and examination revealed infectious arthritis with a chronic urethritis and a tender and swollen seminal sac and enlarged and tender prostate. The patient said that he thought he knew what his trouble was much better than almost all of the doctors whom he had consulted because they all persisted in calling it rheumatism and giving him medicines which upset his stomach, thus spoiling his digestion and doing him absolutely no good. He said he was certain his trouble was all due to gonorrhea and that treatment which had done him more good than anything else had been in one city where the doctor had inserted in the urethra a glass vacuum electrode and gave him electricity in this way. Here was, as can be seen, a case of gonorrheal arthritis and only one man out of a great many had known the best way to treat it. This corroborates very nicely what has been written above.

Infections following some of the infectious diseases are also still called rheumatism, but by what stretch of the imagination it is impossible to know. It is not uncommon for the grippe to create joint disturbance. A recent case was that of a young woman who had an attack of the grippe and on the second or third day the

wrist and hand became swollen, tender, and painful. There was no suppuration so that it must be put down as a toxic arthritis. Another case was that of a woman who in November, 1909, had a "quinsy sore throat." It was not opened but slowly subsided after two or three weeks. The last of December, 1909, or first of January, 1910, there was an attack of grippe and early in the disease multiple joints were involved. Each of these cases had been diagnosed as rheumatism but of course in the light of a careful history, such a diagnosis falls to the ground.

As remarked above, pneumo-coccic joint involvement is not very common. A recent case of infectious arthritis of the knee following a pneumonia is very interesting. The process became so destructive and the general systemic absorption so great that amputation became necessary as a life saving measure. The stump now has a discharging sinus from which the pneumococcus has been isolated and autogenous vaccines are being used in treatment, but so far with no effect. More surgery is undoubtedly in sight. The infectious arthritis which is most common is one where the joints have been involved more slowly, with acute exacerbations at intervals. The knees or fingers or both are apt to be involved at first, and as the process continues the joints involved become more and more damaged and other joints become attacked. Sometimes the very first beginning of the trouble may be an acute

attack which gives the appearance of being an acute articular rheumatism, but it either subsides in all the joints with a not quite complete recovery or else the joints subside leaving one joint, less often two, as the storm centre in which trouble continues and demands careful treatment. In the acute onset, the fever is high but in the slowly advancing type there is also a temperature and an increased pulse rate showing the systemic septic absorption. When all other avenues of absorption are eliminated, the abdominal viscera must be examined carefully as it is from these that the trouble arises. As before mentioned, in women more especially because of faulty corsets, the abdominal contents are pushed downward and the tighter the lacing and smaller the waste line, the greater is the sagging tendency. In consequence there exists a backing up of the intestinal stream with its fermentation and formation of bacteria and toxins and absorption into the general system (systemic poisoning), and lastly joint (toxic trouble). Looked at in this larger way, it at once becomes evident that salicyl soda, iodide of potash, colchicum, etc., can do no good whatever. Sal soda and aspirin may relieve pain, but it cannot touch the cause of the trouble except as it may, in a very mild way, be an intestinal antiseptic. Intestinal antiseptics, Beta Naphthol and Salol, have relieved some cases but only temporarily, as it must be evident with the above explanation that the basic reasons still exist for a con-

tinuance of faulty digestion and faulty assimilation. To attack this condition the poison already in the system must be eliminated and its manufacture stopped. Both of these objects may be obtained in the great majority of cases but not in all as yet. The sagging tendency may be limited in the first place by making the corset extension (as before described) so that it shall support the abdominal walls from the umbilicus to the pubes, thus holding up (not pressing down) the abdominal contents. An important thing to remember in adjusting any abdominal support to a corset is that the middle section at the waist line must be a little looser than the lower section so that there will be some space for the viscera to go when they are raised. Having thus supported the abdominal contents, they must be stimulated to do their physiological work. In the first place, what is put into them must be prepared in a physiological way by proper mixing with saliva as described before. Then active stimulation may be best supplied by vibration. The hard ball on the spine stimulates the nerve centres. The soft brush on the stomach and intestines and the hard ball on the abdominal lymphatics stimulates all these organs. Let me also reiterate that the liver is an extremely important organ standing between the intestines and the general circulation to filter out the poisons. This is stimulated in a wonderful way by the soft brush over the liver area, front and back. This also stimulates

the flow of bile. It is truly remarkable at times to see indigestion of both stomach and intestines which have been treated with no benefit by the best of medical men in probably the most careful (drug) manner slowly yield and get entirely well and also the joint trouble improve "pari passu." Stimulation applied in this manner results in an increased tone to the muscular walls of stomach and intestines and this results in taking up of the slack to a certain extent and a stronger muscular activity in the digestive movements. The various fluids are also in this way stimulated so that they are secreted more copiously and more rapidly. In this way it is fairly easy to understand how a better and better "tone" is obtained and how a more and more physiological digestion takes place. Hence it *must* also result in a diminution even to complete disappearance of fermentation and formation of bacteria and toxins. In cases where constipation is a serious factor in the backing up of the intestinal stream, although drugs may be used to produce evacuations, the thing to be desired is to get the tone of the muscular walls so improved that they work once again from the stimuli which are provided in nature's own way. This will be spoken of again in the section on the X-ray study on abdominal viscera when the "rationale" of the treatment will be shown still more clearly. This being the cause and the cause thus removed, the consequent joint trouble *must* disappear. All of this takes

time,—in many cases months. And at the same time that the treatment is begun, the joints themselves must receive attention in order to cause the swollen tissues (infiltration) to become contracted and restored to a normal physiological condition. Elimination must also be promoted. Elimination is of necessity very markedly improved through the intestinal canal, and it often happens that an obstinate case of constipation is cured by this treatment just described. This means a great deal by way of elimination. In cases where the hot air baths are used, usually on the lower extremities, the sweating results in a local elimination of toxines through the skin.

In cases where multiple joints are involved, the best results are obtained by the all over electric light baths. The effect here is produced by radiant heat and is one of marked stimulation to the whole nervous system. The bath used by the writer consists of a hundred incandescent lamps, so arranged that they all throw their light on the patient who lies nude upon a couch. All these lamps are in circuit with a regular theatre dimmer (rheostat) so that all the lights are going all the time and the intensity may be graduated from the lowest to the greatest. As the rays of light impinge upon the cutaneous surface, there results a stimulation of the nerve endings. As the rays of light penetrate different structures to different depths, there is a point where each ray is absorbed and at this point

work is done, just the nature of which is perhaps not accurately known. Any way, at the point of absorption the energy is transmitted to the living cell or organism, and it is a known fact that the result is a stimulation in such a way that the local processes tend to a more normal condition. A first bath should not continue for much more than ten minutes. Subsequent baths may be longer, up to twenty minutes, beyond which it should almost never extend. Toward the end of the bath, sweating begins and in this way elimination is increased. The patient is in the bath all over, except the head which is left out. It is of great importance to keep the head cool by an ice cap or electric fan or both. After the light bath, a cool water bath, sponge or shower, is then given followed by a brisk rubbing with a turkish towel. This leaves the patient feeling fine. The general vibration treatment (as before described) is then given with patient lying upon the table. By these methods the poisons are eliminated and vibration and the other physical methods stimulate the physiological processes the stomach and intestines being stimulated to properly perform their work. The liver is also stimulated to functionate properly with the result that bacteria and toxins cease to be manufactured. Lastly the tissues around the joints are stimulated by the vibration and the various electric modalities as above described, so that the infiltration is reduced and the normal in size and struc-

ture is restored. Whatever damage has been done to cartilage, by way of destruction, cannot be replaced, but outside of this, normal conditions can be restored very largely.

There is one type of infectious arthritis which has attacked children very largely. It is a severe infection and there is usually glandular enlargement and the spleen is apt to be enlarged.

This was first described by Dr. Still and hence the name Still's disease has been applied to it. In the light of modern knowledge and in accordance with what has been written, this condition is one of very definite infection. Any one who has followed such a case medically appreciates that the disease continues without being in the least affected by the so-called medical treatment. If, however, treatment is applied in accordance with the principles just elucidated it will be found that the disease may be very much modified in its course and the patient usually put upon a solid foundation for the future.

In all classifications *gout* has a place, as it is considered a disease all by itself. The treatment here, as in preceding types, should be in accordance with the etiology. Now gout has for years been treated upon the uric acid theory, and as everybody now knows uric acid has nothing to do with causing it, but simply is a phenomenon or symptom accompanying an attack. In a typical case, which has existed for a sufficient length

of time, tophi exist in the ears or about the joints which consists of urate of soda deposits. When this stage has been reached the diagnosis is easy, but in early cases, it may be difficult or even impossible. The attacks come on at intervals when the joint or joints are swollen, red and extremely painful. Joints may become thus involved following an acute intestinal disturbance and they might also be the result of auto-infection. The great toe joint has been considered especially liable to attack, but any joint may be involved. It is simply a matter of history in such cases, that there may be recurring joint attacks and attacks following acute intestinal disturbances which have been called gout, but as the years go by, no urate of soda deposits appear and so most of them are really auto-infections with acute exacerbations. Take the cases that are finally susceptible of positive proof as gout. The X-ray studies will show in some of the joints, conditions typical of the classes just described. Hence it is fairly demonstrated scientifically that gout is due to faulty physiology somewhere, often resulting in attacks of acute auto-infection. The following is a case in the writer's experience. A man of forty had a second attack of infectious arthritis with infiltration of the soft structures of the finger joints forming the spindle shaped swelling in all of the fingers. An X-ray photograph showed the bones normal and the process confined to the soft parts. As the process progressed

and fluctuation appeared, the fluid was aspirated with a hyperdermic needle and the microscope revealed urate of soda crystals. Hence a true case of gout but clinically an infectious arthritis which it would seem demonstrates the idea above expressed of faulty physiology (metabolism) and auto-infection. With this description the treatment to be logical would be that just described under infectious arthritis and the results of treatment would completely bear this out. Elimination of poisons induced by all-over electric light baths, all-over hot air baths and physiology stimulated by vibration to spinal nerve centres, to the liver area, to the stomach and abdomen, and lastly to the local tissues (joints) stimulated by vibration and by the D'Arsonval current. The method of eating is extremely important. Add to this physical exercise enough to keep the weight at the proper point and future attacks will be prevented. One method of treatment where the joints are painful described by French writers is the ionic treatment, that is sending in the ion of Lithium by means of the constant current. A small bath tub for the feet or hands according to the case, is prepared with the following proportions: Chloride of Lithium, 20 grams; distilled water, 1000 cc, and sufficient caustic Lithium to render alkaline. This solution is connected by carbon electrodes to the positive pole of the constant current. Another large carbon electrode, covered with twenty-four or thirty thicknesses of

gauze saturated with saline solution, is bandaged in close contact with the skin on the back of the neck, or some neutral point, and connected with the negative point of the source of supply. The current is then slowly turned on until it is one hundred and fifty or two hundred milliamperes, the seance continuing thirty to forty-five minutes. The ion of Lithium is thus driven into the tissues of the affected joints and there is formed a urate of Lithium which is very soluble. These seances are repeated three times weekly and should be followed by an alleviation of the pain with diminished suffering and disappearance of the attack. This method gave relief and cure of the attack in the case referred to above and an alleviation of symptoms in one other case.

Early in the paper the method of eating was discussed and now a word regarding what kind of foods to eat. In former times a great deal was written about not eating meat and restricting the diet very markedly. This was an error which in the light of more modern investigation has been corrected. An editorial writer in the Journal of the American Medical Association for November 30th, 1907, says: "It is striking that the laying up in the body of proteins is, save in the growing young, accomplished only under exceptional conditions and that the body seems to have no such place for the storage of proteins as it has for fats and carbohydrates. The amount of breaking down and build-

ing up of tissue cells that we can detect seems to be far too small to account for the amount of proteins that is required and yet so far as we know, this is the only purpose for which proteins are indispensable. We know that the characteristics of different cells and tissues depend chiefly or solely on their proteins and the proteins in turn differ from one another in the proportion of the various constituent amido acids that they contain. Each class of animals has cellular proteins and blood proteins specific for its own kind as shown by precipitin tests and it is possible that the proteins of every individual differ in some respects from those of every other individual. Consequently the conversion of the multitudinous varieties of proteins taken with the food into the constant proteins of the individual cells must require a most complete reconstruction of the food proteins. In the intestines the proteins are split into their elementary constituents, the amido acids, through the action not only of the trypsin but especially by the erepsin of the intestinal mucosa. These amido-acids are resynthesized into proteins and it seems probable that this process is accomplished by the cells of the intestinal walls and the proteins resulting are those that are found in the blood serum. The excess in amido acids that are furnished in this way by the food and which cannot be used by the organism for the building up of its own type of proteins are, it is believed, deprived of their

nitrogen by the action of certain enzymes and the nonnitrogenous residue may then be available for furnishing heat and energy. By this means the cells are provided by the blood with protein supplies of practically constant composition and the intestinal wall may be looked on as the guardian of the chemical specificity of the individual. In this case it is easy to imagine that the intestinal wall might, under certain conditions, be unable properly to synthesize serum proteins and from this might result serious disturbances in general metabolism. It will be seen from this description that there goes on in the intestinal wall a selective synthesis by which proteins and the serums are utilized by the different cells of the body since the proteins of these cells contain proportions of the various amido acids different from those of the serum proteins. In the light of this kind of physiology, it is at once evident that the ordinary metabolism experiments are erroneous and that it is the mixed diet of the table that is most advantageous for the deficiencies. Certain amido acids of one protein may be replaced by a relative excess of the same amido acids in some other protein."

This shows the importance of the intestinal wall and the extreme importance of keeping up to normal its physiological activities and also demonstrates the fact that the diet must be a mixed one, also that as the old idea demands that there must be restriction in one

direction and greater liberty in another, there *must* result a disarrangement of the stream which is constantly supplying the demands all along its course. Hence it is pretty conclusively proven that the mixed diet in eating as already described is the proper physiological thing. If this is done not only will less meat be eaten, but less of everything will be eaten to the permanent benefit of the individual.

After discussing these classes of joint trouble and their logical treatment, it must not be forgotten that there is as yet an acute inflammatory articular joint trouble which still remains as an entity and called *acute rheumatism*. It has been claimed that a bacillus, called the rheumatic bacillus, has been isolated and similar joint disturbances produced by injecting the same into animals; but these experiments have not been duplicated and so it is probably an infectious arthritis with the organism not yet proved. Anyway the disease involves the joints, two or three being attacked, then others becoming involved in turn, and when the last are attacked the first ones are apt to have subsided. This disease runs its course in four, six, or eight weeks and there should be *complete* recovery. If one or more joints remain not quite completely recovered, it means that in due course of time there may be another attack or that this initial explosion is to be followed by gradual progressive involvement of other joints. In other words this condition

would then fall under one of the classes just mentioned, that is infectious arthritis. In a typical attack of the acute type, or acute articular rheumatism, it is a well-known fact that salicylates have a wonderful effect upon pain and temperature, but in hospital (ward) cases a much more beneficial effect has been obtained by the writer when the patient was put into an all-over hot air bath which was followed by a gentle rubbing. It is remarkable to see pain relieved in this way in a very few minutes when it would require hours if the salicylates were depended upon. If salicylate or aspirin are used it must not be forgotten that the heart is much depressed and needs stimulation. If the case is in a private house the hot water (tub) bath is a fairly good substitute for the hot air. The patient may be gently laid in the tub in just warm water, then the hot water allowed to slowly flow in. The first bath should be only fifteen or twenty minutes, and perhaps never more than one-half or three-quarters of an hour. Contractured joints will slowly straighten and pain disappear in a most gratifying manner. In the acute stage this may be repeated two or three times daily, the last one being given in the evening, and the patient all wrapped up warmly, and it is surprising to see them sleep fairly well without narcotics or salicylates. With recovery setting in contractures must be avoided by gentle massage and manipulation and even splinting or plaster for a very short time if necessary.

Faulty physiology of the intestines has already been referred to and sagging of all the viscera and the importance of their support by an abdominal belt mentioned. X-ray studies of the position and malposition of the abdominal contents have been made by various X-ray workers. I will not give all of their work but simply refer to the works of two or three because they happen to cover the points which are of importance in this paper. Dr. Henry K. Pancoast contributed a paper entitled "A Study of Gastropptosis from the Radiographic Standpoint" in *International Clinics*, vol. 4, 17th series: and Dr. G. E. Pfahler contributed an article entitled "Physiological and Clinical Observations on the Alimentary Canal by means of the Roentgen Rays" in the *Journal of the American Medical Association*, December 21st, 1907; and Dr. Guido Holzknecht also contributed a very interesting article entitled "The Normal Peristalsis of the Colon" in *Münchiner Medizinische Wochenschrift* for November 23rd, 1909. Regarding the sagging of the abdominal viscera the above writers with many others have contributed some valuable X-ray studies showing that these organs occupy quite different positions normally, than anatomists have thought. Pancoast and Pfahler show that the stomach might be anywhere in the anterior portion of the abdomen from above the umbilicus to a position practically resting on the pubes.

The article of Dr. Pancoast has sixty-seven figures

showing different positions of the viscera. Only three of his diagrams will be reproduced.

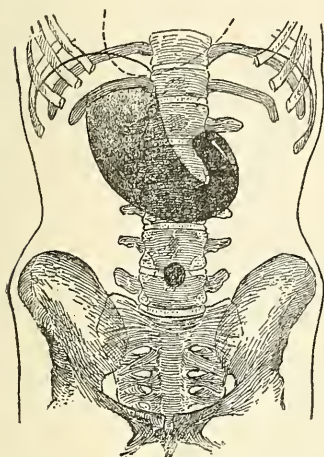


FIGURE 1.

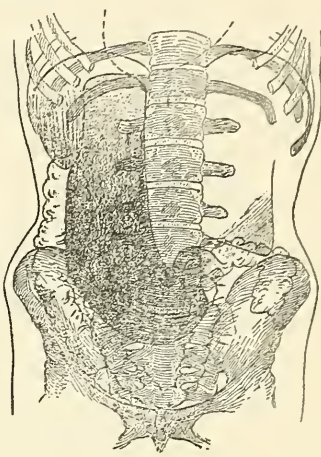


FIGURE 15.

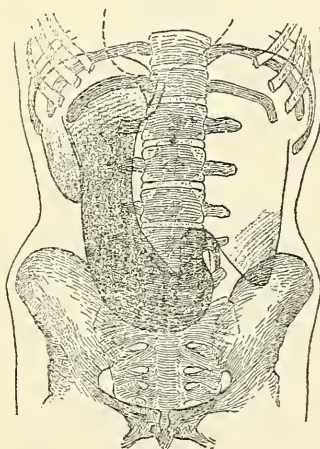
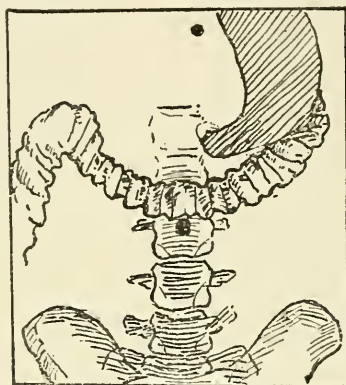


FIGURE 19.

Fig. 1. — This shows Dr. Pancoast's idea of the normal stomach, but in the light of studies of my own in healthy children I should consider this too high.

Fig. 15.—This shows the ptosis of the stomach, liver and also the spleen.

Fig. 19.—This shows in addition to the ptosis of the other organs an extreme ptosis of the transverse colon.



The above is a drawing made from Dr. Pfahler's reproduction and shows his idea of the normal position of the stomach and intestines.

Pfahler considers that in a normal stomach, the pylorus is about one inch above the umbilicus and what seems to be very logical, also, that it is not so much the position of the stomach as the motility. In other words, if the organs are performing their functions properly, there should be no symptoms, but it is under these conditions that dilatation and atony takes place and that trouble begins. It is also in these conditions that the stimulation and toning up is accomplished, so much more effectively by the methods before described (physical therapeutics) than by medication.

The important lesson to be learned from these X-ray studies, however, is that the position of the abdominal viscera is different in the living than we have been taught from the dissection on the cadaver and from the recognized books on what might be called "dead" anatomy. Now with the coming of "living" anatomy as shown actually "in situ" by the X-ray it is an entirely different proposition. As will be noticed in the figures of Pancoast and Pfahler the stomach is more nearly straight up and down hanging in the anterior part of the abdomen like a bag and hanging very much lower than there was any idea of, the normal position being down near the upper level of the pelvis (ilia). This position which at first seems to be away down at the bottom of everything must be now recognized as a "new" and "living" normal. The transverse colon and the "flexures" also become drawn or pushed downward and it would seem thus far in the new X-ray study of these conditions that the colon is really more displaced from normal than the stomach. In all these cases unless there is a *marked* displacement it would seem that Pfahler's conclusions were the correct ones, that it is not so much the ptosis of the organs as it is their motility. In other words if the physiological work of these organs is all right a certain amount of leeway may be allowed regarding their position. In sagging organs there is more or less atony and consequent sluggishness of action, and then the important thing is to so stimulate them that such action may be re-

stored. It is just this problem that must be solved and that is at the bottom etiologically in chronic joint diseases.

The paper contributed by Holzknecht is the latest and most important communication regarding the intestines and their method of action. I am simply repeating nearly verbatim a part of his extremely interesting message. He calls attention to the fact that radioscopy has shown that peristalsis of the oesophagus consists in an annular contraction some centimeters in length which follows the contraction of the pharynx and forces the bolus along the course of the gullet, also that the normal peristalsis of the fundus and the antrum and a terminal contraction (pylorus). The chyme in the small intestine is also propelled by a series of short jerks. Then he has personally observed the abdominal viscera in over one thousand fluoroscopic examinations and with two exceptions has always found the large intestine immobile. In these two cases, however, twenty-four hours after a bismuth meal, the following interesting phenomenon took place. The segmentations in the transverse colon disappeared, the outlines of the intestines becoming perfectly smooth like a ribbon with parallel borders and the contents were with equal rapidity forced forward into the descending colon which had been previously empty. The time occupied in this whole movement was estimated at about three seconds. Just as soon as this transference was completed the haustral segmentation reappeared and the transverse colon re-

mained empty. The patient was entirely unaware of any movement. Experiments in Holzknicht's hands show that kneading, massage, etc., had no effect in the locomotion of the intestinal contents, while on the other hand, Groedel has observed that vibratory massage hastens the progression of the contents. Normally this movement, involving about one-third of the intestine each time, takes place about three times in twenty-four hours. In the interim, it is held in the haustral segmentation perfectly immobile, where absorption takes place.

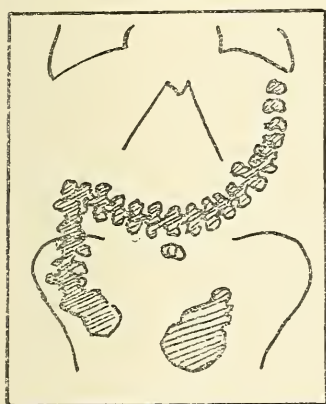


FIGURE 1.

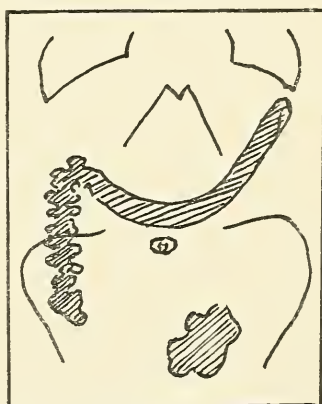


FIGURE 2.

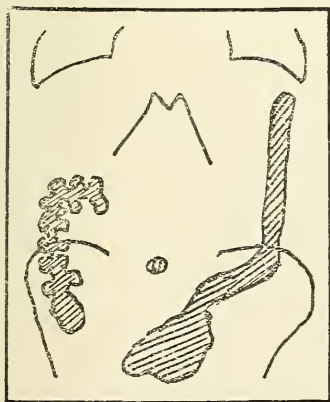


FIGURE 3.

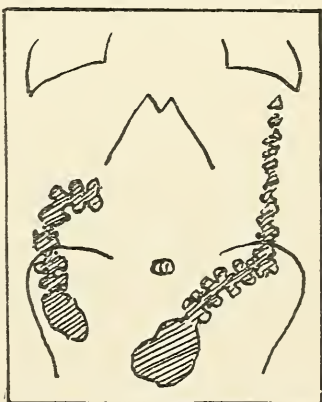


FIGURE 4.

Drawings made from Holzkmnecht's figures are also here reproduced.

Fig. 1. This shows (24 hours after the bismuth meal) the colon completely filled, up to the splenic angle. The sigmoid flexure is also completely filled and all of these portions when observed in the fluoroscope are immobile.

Fig. 2. — This shows the observation when the segmentations in the transverse colon suddenly disappeared and the intestine flattened out, the ascending colon remaining the same.

Fig. 3. — This shows the observation when the transverse colon had been suddenly emptied into the descending colon and then as in Fig. 4, the haustral segmentations immediately reappeared in the whole length of the intestine at the same instant.

All of this throws light on so-called faulty physiology with the sagging or ptosis of abdominal viscera, its resulting atony and interference with intestinal mobility, first causing fermentation, bacteria, toxins, and absorptions, with consequent joint involvement. This is of importance in constipation. This sudden transference of the intestinal contents of one section to another may be the normal mechanism; and if so, further study will demonstrate it. While the intestine remains immobile with the contents held tightly in the haustral folds, the juices of the intestine are given out and at the same time whatever is of value in that partic-

ular stage of digestion is absorbed. When the intestine suddenly straightens out and the contents are forced along, it must be done by muscular contraction, and this muscular contraction takes place as the direct result of some physiological stimulus. This stimulus may be due to a certain degree of osmosis which has taken place or the attainment of a certain chemical reaction due to a certain stage of osmosis. Hence it is that vibratory massage to the spinal nerve centers, to the abdomen, and to the muscular walls themselves is a much more rational measure than massage or medication. This is borne out by the actual results of treatment. This does not mean that cathartics are no longer necessary. But it does mean that it is a very logical treatment to get the entire physiology to working properly.

Another important thing along nature's lines is physical exercise. In many of these chronic joint disease cases, especially in women who are inclined to be stout with the fat tissue predominating around the hips and on the abdomen, physical exercise will reduce the fat in these areas; and, if the weight is kept down below a certain point, the patient may remain perfectly free from joint trouble. The exercises should be given always at the office gymnasium under competent supervision, and those to be preferred are in the abdominal chair which directly calls into use the muscles of the legs and abdomen, similar to bicycle

riding. The rowing machine is another excellent exercise. Standing erect with arms by the side and chest expanded and alternately pulling up the lower abdomen by voluntary muscular exertion and allowing it to sag again, standing erect with arms extended over the head, then stooping over forwards and touching the toes with the tips of the fingers while the knees are held straight, are excellent movements which assist in removing fat from the abdomen. The heart is to be looked out for and the patient watched and not very much in the way of exercise done at home especially in older adults, otherwise damage will result. The important rule is that all this work should be done under competent medical supervision.

It is along physiological (nature's) lines that treatment should be administered in the chronic joint diseases. It means building upon a perfectly safe and solid foundation and then instructing patients how to keep themselves in proper condition by methods of right living, in this way insuring them perfectly against not only the joint diseases under discussion but probably against all chronic diseases outside of malignant diseases and infection introduced from without.

As a result of this work it will be seen that the types now pretty generally recognized are those originally described by Goldthwait but the writer would classify them a little differently.

Gout is very definitely shown to be due to faulty

physiology and hence comes under auto-infection or auto-intoxication.

Also in the observation of a number of cases of atrophic arthritis which have remained such for years, it has been observed that attacks, (very mild at first) come on, where the swelling takes place only to shortly disappear, then later, redness and permanent infiltration of soft structures with a more rapidly progressing process, thus placing this type also under auto-infection or auto-intoxication.

Hence the classification most satisfactory to the writer is the following: —

		Villous Arthritis
Auto-infection	}	{ Atrophic Arthritis
or		{ Hypertrophic Arthritis
Auto-intoxication		{ Infectious Arthritis
		{ Gout

Fig. 1 and 2 is the same knee showing the calcified tips of the villi “in situ” and also after removal.

Fig. 3 shows an atrophic arthritis in which the cartilage is atrophied, but it is to be noted that the bone salts have been washed out so that the bones appear very thin.

Fig. 4. A normal knee is presented for contrast with Fig. 5 in which joint the cartilage is atrophied so that the bones are in actual contact.

Fig. 6 shows a later stage of the atropic process

when the cartilage has practically disappeared and bony ankylosis has actually taken place.

Fig. 7 shows the overgrowth of bone or hypertrophy at the upper border of the patella and also along the edges of the joint surface of the femur.

Fig. 8 shows the two rows of joints in the fingers with the cartilage atrophied and bone destruction taking place. In the terminal joints the lipping of the bone at the sides is apparent, thus showing the mixed type.

Fig. 9 is the picture from a demonstrated general infection with multiple joint involvement.

Fig. 10 shows the ultimate stage in an infectious arthritis.

Fig. 11 shows a wrist joint involvement from a gonorrhoea.

Fig. 12 is interesting when compared with Fig. 14, a gouty elbow, and also that one of the joints might be considered (from the X-ray alone) a Charcot joint, but here again is a case of known infection.

Figs. 13, 14, and 15 are all from one patient who has a (demonstrated) gout. There were tophi in the ears and he could write on the blackboard with the fingers, there was so much urate of Soda deposited in crystals.

Fig. 16 was also a demonstrated case of Charcot joint in a man suffering from Tabes.



FIG. 1. VILLOUS ARTHRITIS.
Showing calcified tips of villi.



FIG. 2. FLOATING CARTILAGES FROM ONE KNEE JOINT.
Case of villous arthritis with calcified tips of villi.



FIG. 3. ATROPHIC ARTHRITIS.



FIG. 4. NORMAL SPACE IN NORMAL KNEE JOINT.



FIG. 5. ATROPHIC ARTHRITIS.
Demonstrated by diminution of space between bones.



FIG. 6. ANKYLOSIS OF KNEE JOINT.
Case of atrophic arthritis.



FIG. 7. HYPERTROPHIC ARTHRITIS.



FIG. 8. ATROPHIC AND HYPERTROPHIC ARTHRITIS.
Mixed type.



FIG. 9. INFECTIOUS ARTHRITIS.



FIG. 10. ANKYLOSIS OF THE KNEE JOINT FOLLOWING
INFECTIOUS ARTHRITIS.



FIG. 11. GONORRHOELAL ARTHRITIS.

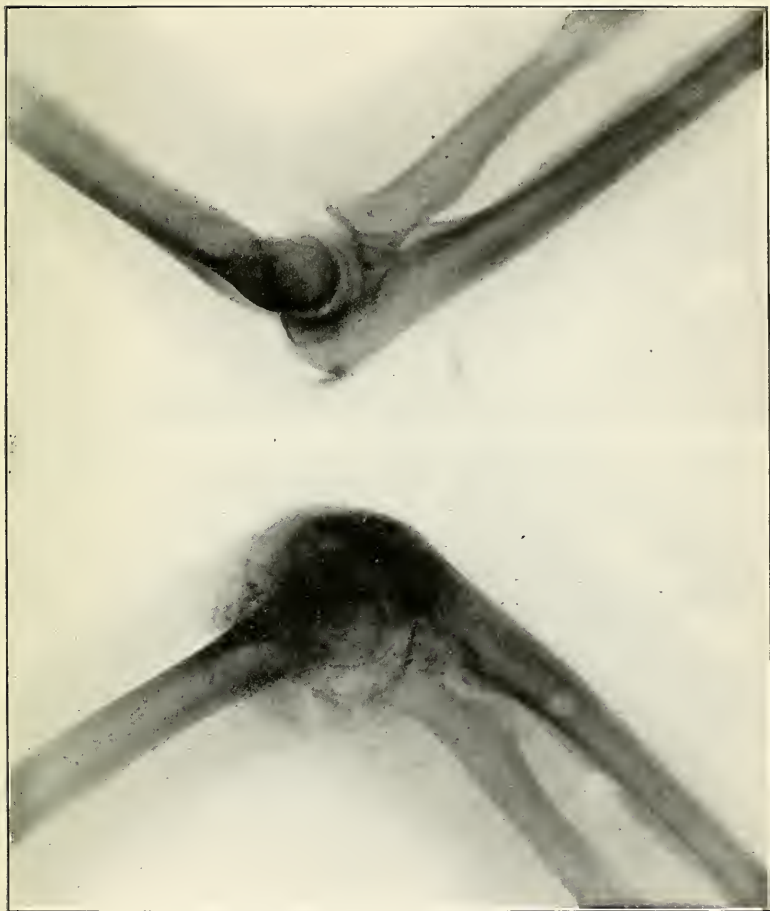


FIG. 12. INFECTIOUS ARTHRITIS OF ELBOW.



FIG. 13. GOUTY HAND.



FIG. 14. GOUTY ELBOW.



FIG. 15. GOUTY KNEE.



FIG. 16. CHARCOT JOINT.

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Annex

